

DEPARTEMENT TOEGEPASTE ECONOMISCHE WETENSCHAPPEN

ONDERZOEKSRAPPORT NR 9615

European Anti-dumping Policy and the Profitability of National and International Collusion

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Wettelijk Depotnummer: D/1996/2376/15

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1. Introduction

In recent years the analysis of antidumping policy under imperfect competition has gradually progressed. One strand of emerging literature deals with the impact of anti-dumping policy on production decisions of domestic and foreign firms (see a.o. Dixit (1988), Prusa (1992), Fischer (1992), Reitzes (1993)). The consensus is that the mere threat of antidumping law enforcement affects firms' decision-making. Typically, in a quantity-setting oligopoly, domestic output is increased and foreign exports are decreased in the face of possible antidumping measures. This suggests that antidumping policy has a pro-competitive impact on domestic firms. Total domestic welfare effects can be positive or negative, depending on the type of competition that prevails in the domestic market.

Another strand of literature deals more specifically with the relationship between cartels and anti-dumping policy. Staiger & Wolak (1989) shows that the imposition of anti-dumping duties may reduce the attractiveness of collusion for foreign firms in their own markets, restricting the possibility to dump excess capacity in the protected market, thereby suggesting a pro-competitive effect of domestic antidumping policy in the foreign market. At the same time, in a repeated game setting anti-dumping duties can be used by domestic firms to credibly punish deviations by foreign firms from an international cartel scenario. This was demonstrated by Staiger & Wolak (1992) suggesting an anti-competitive effect of antidumping policy.

Although the model presented in this paper could be used to analyze the central issues of the first strand of literature, we will predominantly focus our attention on how antidumping policy influences the incentives for and the profitability of domestic and international cartels. In contrast to most other papers in this area we will consider the European practice where besides duties, undertakings are important antidumping measures and where the focus of the antidumping law seems to be more on the injury than on the dumping requirement (Vandenbussche 1996).

The main question tackled in this paper is whether a European-like antidumping regulation helps to establish, maintain or rather endanger full cartels as well as cartels restricted to domestic firms only. For this purpose we construct a partial equilibrium model, restricting antidumping law enforcement to the European government. The set up is a multi-stage one with perfect foresight for all players and no a priori commitment by the government whether and which measure to impose. The environment in which the firms operate is characterized by cost asymmetry and product heterogeneity between domestic and foreign firms, with the foreign firm typically enjoying a cost advantage over the local EU companies. The rationale for lower foreign prices, which induce anti-dumping filing, is efficiency-based rather than driven by predatory motives. The results of the model are derived algebraically and simulations were used to gain greater insight. Our findings suggest that the type of

measures taken, their impact on the incentives to collude and the resulting market structure, as well as their welfare effects all depend on the objective of the government together with extent of cost-asymmetry and product differentiation. When the welfare objective is total domestic surplus, antidumping regulation is anti-competitive and cartelizes the market. In that case we observe mainly duties and the domestic welfare effect is positive. When the government excludes domestic consumer interests from its welfare objective, we predict a lot more undertakings which can have both an anti- or a pro-competitive effect but decrease total domestic welfare.

In the next section we discuss the model in detail. Section 3 reports the results of measures imposed and change in market structure for various degrees of cost-asymmetry. The robustness of these results are checked in section 4 where we consider various extensions of the model. The welfare effects are discussed in section 5, where the possibilities for rent-shifting are examined. In line of the political economy of protection hypotheses, the issue of rent-seeking is touched upon in section 6. The last section summarizes the main results and hints at some policy conclusions.

2. The model

In order to study the effect of anti-dumping legislation on market structure and more specifically on the profitability of national and international collusion, a simple model is used with 3 firms, 1 foreign and two domestic firms. The analysis focuses only on the local market in which the anti-dumping legislation prevails. The two domestic firms are perfectly symmetric, producing a homogeneous good. The foreign firm supplies a differentiated good that typically can be supplied at lower (or equal) costs as compared to the domestic products. The local market is fully segmented from other international markets, including the home market of the foreign firm such that the foreign firm's objective can be restricted to its profits in the local market. All this results in the following demand function for the domestic product:

$$p_i = a - (q_i + q_j) - \gamma q_F \quad (1a)$$

with a : measure of market size
 $i \neq j=1,2$ representing both domestic firms
 F representing the foreign firm
 and $0 < \gamma \leq 1$, measuring the degree of product differentiation

$$p'_i = p_i - m \quad (1'a)$$

with m : constant marginal cost of the domestic firm

Conversely for the foreign product, we have

$$p_F = a - q_F - \gamma \cdot (q_i + q_j) \quad (1b)$$

$$p'_F = p_F - m_F \quad (1'b)$$

with m_F : constant marginal cost of the foreign firm

Demand for domestic and foreign product are independent for $\gamma=0$. Products become closer substitutes as γ moves to 1.

The cost asymmetry between the domestic firms and the foreign firm is reflected in:

$$a - m = s \cdot (a - m_F) \quad (2)$$

with $0 < s \leq 1$ measuring the degree of cost-asymmetry.

The smaller s , the larger is the disadvantage of the local firm vis-à-vis the foreign firm. In order to have a viable domestic industry, γ is required to be smaller than s .

With three firms in the industry, the following three market structure outcomes can arise: (see also table 1)

i) a **triopoly** with all firms deciding non-cooperatively on their output decision à la Cournot-Nash ¹, further labeled as the (1,1,1)-scenario. The maximand in this case is:

$$\max_{q_1} p'_1 q_1 \quad \& \quad \max_{q_2} p'_2 q_2 \quad \& \quad \max_{q_F} p'_F q_F \quad (3)$$

ii) a **duopoly** with the foreign firm and a domestic cartel, which includes the two domestic firms coordinating their output decisions, further labeled as the (2,1) -scenario, with the corresponding maximand ²:

$$\max_{q_1, q_2} p'_1 q_1 + p'_2 q_2 \quad \& \quad \max_{q_F} p'_F q_F \quad (4)$$

iii) a **monopoly or full cartel** where all 3 firms coordinate their output decision to maximize joint profits in the local market, further labeled as the (3) -scenario. The monopoly maximand is:

$$\max_{q_1, q_2, q_F} p'_1 q_1 + p'_2 q_2 + p'_F q_F \quad (5)$$

Any coalition of firms can be established (cf. coalition proofness concept as used in Malueg & Tsutsui (1995)) that satisfies the following conditions:

- i) every firm in the coalition (i.e. those that coordinate their quantity choices in order to maximize joint profits) has an incentive to join. This realizes internal stability as described in d'Aspremont et al (1983)
- ii) every firm outside the coalition (i.e. those that behave non-cooperatively against the coalition) do not want the join (cf. external stability in d'Aspremont et al. (1983)) or will be excluded by the coalition members if an extension of the coalition hurts the members.

Following this, the domestic cartel (2,1)-scenario will be the outcome if the domestic firms increase their profits with respect to a triopoly and when either the domestic firms or the foreign firm do not want to join a full cartel. A full cartel (3) -scenario will only prevail if both domestic firms as well as the foreign firm realize higher profits as compared to the alternative (2,1) or (1,1,1) -scenario. ³ Note that a coalition of one domestic firm and one foreign firm is never an equilibrium choice given that it is always dominated by at least one of the other market structure outcomes.

¹ With product differentiation the results can always be translated into a Bertrand competition with capacity constraints à la Kreps & Scheinkman (1983).

² The duopoly scenario with the foreign firm coordinating with only one of the domestic firms is ignored, cf infra.

³ The option of side payments made by one party to induce the other party to the payer's most preferred outcome would typically lead to the outcome where the highest joint profits are realized. Given problems of legal enforceability, the option of side payments is only marginally considered in further analysis (see section 4).

As soon as all coordinating firms, i.e. both domestic firms in the (2,1) -scenario and all 3 firms in the (3)-scenario, realize higher profits from cooperation as compared to the non-cooperative outcome, it is assumed that cooperation between these firms can be established.⁴ This assumption implies a.o. that if the foreign firm would not be present in the local market, the two domestic firms always have an incentive to coordinate. This implies that the pre-entry market structure is an implicit domestic cartel. Given that the operating profits of the foreign firm are always taken to be positive⁵, the decision of the foreign firm to enter the local market can be fixed and is not influentuable by the domestic parties⁶.

In each of the market outcomes the domestic firms have the option to **file an anti-dumping complaint**. Following the current EU anti-dumping legislation (see EC regulation 2423/88)⁷, firms can file under the following conditions:

- i) the price charged by the foreign firm in the local (EU) market is lower than the firm's price in its home market. This condition refers to the "dumping margin".

Without explicitly modeling the foreign market, it is assumed that this always holds, if only because the foreign firm faces less competition at home.

- ii) the domestic firms filing an antidumping complaint should hold more than half of the domestic production.

This condition is always met in the model with the foreign firm not necessarily producing in the local market and the perfectly symmetric domestic firms, having an identical incentive to file. Free-riding with respect to filing can hence be dismissed.

- iii) The foreign firm's price in the local market should be lower than the domestic price. This price undercutting determines the "injury margin" (Vandenbussche (1996))⁸

Note that this undercutting is more likely to hold with a cost-disadvantage of the local firms.

The EU anti-dumping legislation does not in any instance discriminate between "injury" following from normal competition and "injury" from predatory behavior on the part of the foreign company to

⁴ Despite the benefits from cooperation, this cooperative outcome is not a Nash equilibrium in a one-shot quantity/price game, given the incentives to cheat, cf. the Prisoner's Dilemma. However, it is well known that such a cooperation can be established in an (in)finitely repeated version of the quantity game, if players are sufficiently patient, while using grim trigger strategies, (Green & Porter (1984)) or stick & carrot strategies (Abreu et al (1986)). Also Staiger & Wolak (1992) use an infinitely repeated scenario.

⁵ If foreign operating profits would be negative, this would also imply negative profits for the domestic firms given the cost-asymmetry.

⁶ One could include a fixed sunk cost of entering only born by the foreign firm, in which case the decision to enter can be studied explicitly as being based on operating profits and this fixed fee, which could then become negative.

⁷ EU regulation 2423/88 is the latest implementation of the WTO (ex-GATT) anti-dumping in EU legislation.

⁸ The EU legislation stipulates that only when dumping causes injury, protectionist measures can be taken. Vandenbussche (1996) shows that price-undercutting is the determinant factor for the injury calculation.

drive out domestic firms. Given no incentives for predation in our full-information one shot-production game, the “injury” is only caused by normal competition.

In case the domestic firm(s) decide to file, there are legal expenses for all firms, including the foreign firm, presented by $\varepsilon > 0$. The domestic firm will decide to file if the net benefits after filing outweigh the costs ε .

Once the case arrives at the Council of Ministers, a Duty or an Undertaking can be decided upon⁹. By EU law, an **Undertaking** is a voluntary price increase by the foreign firm to align on the domestic price, i.e. firms will be optimizing given the restriction that $p_F = p_i$ which in our model implies $q_F = q_1 + q_2$. An undertaking results in equal post-file prices. In this context, an Undertaking is interpreted as an agreement by the foreign firm not to price undercut the domestic firms. This agreement is assumed to be binding given that the commission closely monitors the undertaking and in case of violation, can impose a penalty. A **Duty**, t , serves to eliminate the injury margin, increasing the cost of the foreign firm, $m_F + t$. A complete elimination of the injury margin would require setting the duty equal to *post-file price differences between p_i and p_F* , in which case the same price/quantity levels would prevail as in the undertaking case. Implementation of such a duty level requires government to have information on cost levels, in practice a non-trivial condition. Indeed, careful analysis of case implementations shows (Vandenbussche (1996)) that duty levels imposed equal the pre-file injury margin. Hence the duty, t , will be set equal to the *pre-file difference between p_i and p_F* . To the extent that the foreign firm will absorb part of the tariff, a duty will typically not lead to equal post-file prices. Given that the model wants to follow the EU practice as close as possible, the focus of the analysis reported here is on pre-file price differences as duty level. Post-file price differences are discussed as alternative in section 3.4.

In deciding on if and which measure to impose, the government is assumed to maximize local welfare represented by G . The EU anti-dumping regulation obliges policy to meet “community interests”, which is composed of three elements, local consumer surplus domestic firms’ profits and any possible tariff revenue

$$G = z_c \cdot CS + z_p \cdot \{2(\pi_i - \varepsilon)\} + z_t \cdot t \cdot q_F \quad (6)$$

with z_c : the weight given to consumer surplus

z_p : the weight given to producer surplus

z_t : the weight given to tariff revenue

$$CS = \{(2q_i)^2/2 + q_F^2/2 + \gamma(q_1 + q_2)q_F\} \quad ^{10}$$

Different weights can be attached to consumer and producer interests, as well as tariff revenues by varying the parameter, z . Three typical cases will be distinguished. First, the Community Interest Clause is implemented through a cost-benefit analysis, which implies that consumer interests are fully taken into account ($z_c = z_p = z_t = 1$). In practice however this Clause has never been implemented,

⁹ This modelling follows EU practices. An a priori commitment of the government towards either a Duty or an Undertaking is only marginally considered in further analysis.

¹⁰ For a derivation of the expression of consumer surplus, see Pauwels et al. (1995).

indicating that a scenario where consumer surplus is ignored, fits better with EU reality. ($z_c=0$, $z_p = z_t = 1$). This latter scenario reflects, a.o., government's decision to be driven by lobbying activities, which typically producers rather than consumers are willing to organize and fund, see section 6. An often heard critique on EU anti-dumping regulation is precisely that the procedures are biased in favor of aggrieved producers and have taken little account of the views of consumers. Likewise, trade policy such as anti-dumping measures is often proclaimed to be used for industrial policy objectives (Gual (1995)), again rendering local producers' profits more important in the government's objective function. Finally, tariff revenue can be included in total welfare if the government invests the duty revenue in a welfare maximizing way. In principle, the EU government has to repay the duty revenue collected to the foreign firm. Hence, a third scenario with tariff revenues ignored ($z_c=0$, $z_p = z_t = 1$). is considered. However, it typically lasts up to 10 years before the government actually pays the duty revenue. Hence this payback option can be easily discounted, leaving the second scenario ($z_c=0$, $z_p = z_t = 1$) to be the most relevant to describe current EU practice.

Table 1 summarizes the model structure and reports for each distinguished scenario domestic and foreign production and profit levels. The EU's government objective can be calculated following (6), on the basis of the expressions for π_i and t , together with q_i and q_F . The equilibrium outcome in terms of whether and which anti-dumping measure will be imposed and which market structure will prevail is determined through a subgame perfect Nash equilibrium which is obtained through backward induction. To characterize the Nash-equilibrium outcome, first the government's choice between *no measure*, *a duty* or *an undertaking* has to be determined, on the basis of which the post-file quantity choices will be made. The outcome where the government would impose no measure is not reported in the table, since it coincides with the no-file outcome with firm profits simply diminished by ε and government's objective diminished with $z_p \cdot 2\varepsilon$. For a given market structure, the domestic firms will always prefer an undertaking decision over a duty, although the difference between the two outcomes becomes smaller with smaller asymmetries. Consumer surplus will typically be lower with an undertaking decision as compared to a duty, except in a full cartel market structure, in which case consumer surplus turns out to be higher with undertakings than with duties. Again, this difference decreases when asymmetries are reduced. The foreign firm likewise prefers an undertaking over a duty in most instances.¹¹ Whereas local producers always benefit from the intervention, local consumers are always on the losers' side..

¹¹ Except in a domestic cartel, where a duty results in higher foreign profits than an undertaking decision, at least if the asymmetry is not too small, i.e. $s < s^*$ where s^* decreases for lower values for γ .

The foreign firm also loses, typically when its cost advantage is large and when duties are imposed.¹² As already indicated, all these results hold for a given market structure. What remains to be established is the main contribution of the paper, namely profits and welfare when market structure can be chosen endogenously in the full model structure.

Given the government's decision, the domestic firms' decision whether or not to file in case the conditions for filing are met, can be determined on the basis of profit maximization. Given the filing decision, the choice of market structure can finally be assessed, following the procedure described supra. Only if the foreign firm would be making negative profits in the prevailing market structure, will it decide not to enter in which case the final outcome would be a cartel formed by the two domestic firms.

The equilibrium outcome, in terms of market structure chosen and the type of anti-dumping measure imposed, is discussed in section 3. The results are discussed as a function of the level of cost-asymmetry (parameter s) and product differentiation (parameter γ) and this for the various policy implementation scenarios discussed supra. Some robustness checks are discussed in section 4, while the welfare implications are suspended until section 5.

3. The Results

The basic focus of this paper is on the impact of the presence of an EU-like anti-dumping legislation on the local market structure, i.e. the incentives for firms to engage or not in domestic or full cartels. For this purpose, the outcome with the anti-dumping legislation, as follows from table 1, is compared to the outcome in case of no anti-dumping legislation, which amounts to comparing firm profits and welfare in the various no-file outcomes, as reported in the same table 1. While the foreign firm always prefers a full cartel in the no-file situation, the domestic firms can prefer a full cartel versus a domestic cartel or a non-cooperative outcome depending on the asymmetries and product heterogeneity, indicating that each of these three market outcomes can prevail in the no-file situation.

The results are based on numerical simulations with modest filing costs, i.e. $\varepsilon=0.1$ which amounts to 1% of the pre-entry domestic profits. For sensitivity of the results with respect to filing costs, see section 4. The discussion of the results is illustrated with graphs in the (s, γ) -space. The parameter s , plotted on the Y-axis, represents different values of cost asymmetry where $s=1$ is the symmetric case. The parameter γ , plotted on the X-axis represents different values of product heterogeneity where $\gamma=1$ is the identical product case. In order to maintain a viable domestic industry, the restriction is imposed that products need to be increasingly more differentiated when cost-asymmetries become larger: $\gamma < s$. The EU antidumping legislation requires that the foreign product is a 'like product' or a similar product compared to the locally produced product. Therefore we limit our attention to parameter constellations $s > \gamma > 0.55$. Figures 1 through 3 show equilibrium market

¹² Foreign firms may however gain from undertakings, but only when the cost asymmetry is small (in the infra reported numerical example when $s=0.95$ for a domestic cartel and $s=0.8$ for a triopoly).

structure outcomes without and with anti-dumping regulation, as represented through the variously hatched areas. In addition, these figures represent through the thickly outlined areas the anti-dumping measure prevailing in the equilibrium market structure. What is not represented in the graphs are the anti-dumping measures that prevail in other, out-of-equilibrium market structures. These choices will show up in the description of the results to explain the arising of the various equilibria.

3.1. Symmetry

The outcome in case of symmetry between domestic and foreign firms, $s=1$, is worth reporting as a first benchmark for further asymmetric scenarios. Without anti-dumping legislation, domestic firms as well as the foreign firm always prefer to join a full cartel, thus monopolizing the market. The government of course favors a non-cooperative triopoly outcome, at least if consumer interests are taken into account. With the anti-dumping legislation, filing is not possible when $s=1$, given equal post-entry prices and the outcome remains a full cartel with or without anti-dumping legislation. This result holds irrespective of filing costs and government decisions in terms of whether and how to intervene with duties versus undertakings.

The analysis becomes more interesting when asymmetries between domestic and foreign producers are taken into account. The ideal case where the Community Interest Clause is being implemented by the EU government is discussed first in section 3.2. Section 3.3 describes the results in the more relevant case when this Clause is left unimplemented. Section 3.4 discusses the results when tariff revenues are disregarded. In the presentation of the results we will make a distinction between the market structure ruling before and after antidumping implementation. The results will be separated by a slash, with the pre-antidumping outcome before and the post-antidumping outcome after the slash.

3.2. Cost asymmetries: the case of a Community Interest Clause $(G = CS + \{2(\pi_i - \epsilon)\} + t \cdot q_F)$

(i) A full cartel as pre- or no anti-dumping outcome

The easiest scenario to start with is the **full cartel** scenario (area D). If cost-asymmetries are small and furthermore products are sufficiently differentiated, not only the foreign firm, but also the domestic firms have an interest in joining a full cartel, in the absence of anti-dumping procedures. When an EU-like anti-dumping procedures prevails, domestic firms will file. The government prefers an undertaking over a duty in case of full cartelisation, despite the forbearance of duty revenues but because domestic profits together with consumer surplus are higher.¹³ All this implies no change in market outcome in the existence of an EU-like anti-dumping legislation, i.e. a full cartel is maintained, while domestic firm's profits and welfare improves through the undertaking.

¹³ Note that if the market structure would have been a domestic cartel, the government would in this parameter configuration "only" impose a duty.

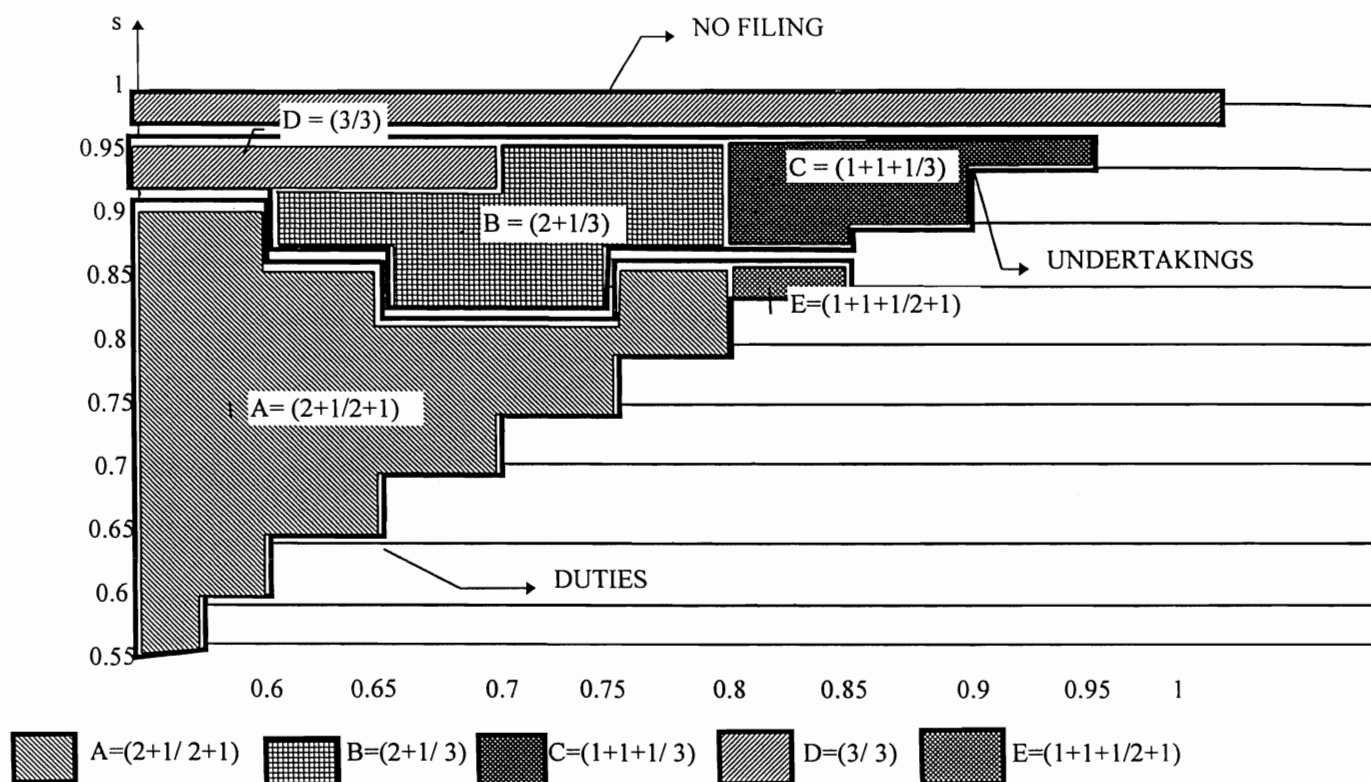


Figure 1: Change in Market Structure and Antidumping Measures
 Consumer surplus *included* in the Government's objective function $z_c=1$ and $z_i=1$

(ii) *A domestic cartel as pre- or no- anti-dumping outcome*

A domestic (2+1)-cartel scenario arises in case of large asymmetries (area A), but can also occur with smaller asymmetries as long as products are sufficiently, but not excessively differentiated (area B). While the foreign firms always prefer a full cartel, such a full cartel is not desired by the domestic firms given that they are at too much a cost-disadvantage relative to the foreign firm (area A) or because products are not enough differentiated (area B). Consequently, the domestic firms would be carrying the largest share of the cost of colluding which comes from restricting output in order to increase price. In the absence of side payments from the foreign to the domestic firms, only a cartel restricted to the domestic firms will be the market structure outcome.

If antidumping legislation prevails, it matters crucially which measures the government will take.¹⁴ In case of large asymmetries (area A), the government will always impose a duty if domestic

¹⁴ The government will always impose a measure, duty or undertaking, after filing, at least when tariff revenues are included, cf infra. No measure would result in lower welfare, within a given market structure.

firms file, whatever the market structure that would arise. This typically implies that a domestic cartel is maintained as market structure and the presence of anti-dumping legislation has no impact on market structure. The duty nevertheless increases domestic profits and total welfare despite a drop in consumer surplus. If the foreign product is sufficiently differentiated, $\gamma \leq s - 0.2$, it would pay for the domestic firms to move to a full cartel, because the tariff has smoothened enough the prevailing disadvantages. However, in this case, the foreign firm, given the imposition of a duty, prefers to behave non-cooperatively against the domestic cartel rather than joining a full cartel, leaving again the no-file market structure unaffected by the dumping regulation.

When the asymmetries are small, the government would still impose a duty in case the market structure is a domestic cartel¹⁵. As long as also a duty is imposed in a full cartel, we have an identical market structure with or without anti-dumping regulation (area A). But if the government prefers an undertaking in a full cartel, which occurs if products are not too differentiated and asymmetry is low enough, then the domestic firms prefer a full cartel over a domestic cartel only. In the absence of side payments, a switch in market structure will however only occur if the foreign firm is willing to cooperate with the domestic cartel, given the presence of an undertaking decision. This will only occur if the cost advantage of the foreign firm is not too large (area B). Hence, in this area of parameter configurations, the presence of an EU-like anti-dumping regulation increases the scope for collusion: from a domestic cartel only to a full international cartel, a case where anti-dumping regulation clashes with anti-trust.

(iii) A triopoly as pre- or no- anti-dumping outcome

The case of a **triopoly** as the pre-anti-dumping -scenario arises if products are not too differentiated (i.e. γ is never lower than 0.8, while always being smaller than s). That is to say that foreign entry will cause the domestic cartel to break down.(areas C and E).

Note that when asymmetries are too small ($s > 0.8$), there will be no injury or price undercutting if the market structure would be a non-cooperative triopoly. Hence, in this case the domestic firms have no filing option in a triopoly, but they can file in case of cartelisation. With consumer interests taken into account, the government would impose a duty in case of a domestic cartel (area E) but would prefer an undertaking in case of a full cartel (area C). With firms correctly anticipating these government choices, they will prefer a full cartel setting, given the higher protection offered through the undertaking (area C). Hence anti-dumping legislation turns a triopoly into a full cartel with undertaking. We have here again a clear instance where anti-dumping clashes with anti-trust. If the asymmetry is large, i.e. $0.8 < s < 0.9$, “only” a domestic cartel will be established (area E), despite the preference of the domestic firms for a full cartel, but because the foreign firm prefers to

¹⁵ A filing cost $\epsilon = 0.1$ prevents filing in a domestic cartel where duties are imposed if $s > 0.9$ and $\gamma \geq 0.7$. But even when filing costs would be low enough to allow for a file, the reported results are not affected. Note that in a triopoly, there will never be a file, either because of no undercutting with $s > 0.8$ or with $s = 0.8$ because the filing cost $\epsilon = 0.1$ outweighs the benefits from filing, given that only a duty is decided when consumer interests are taken into account.

behave non-cooperatively. In any case, the foreign firm will gain from the existence of anti-dumping regulation, and this because of the induced change from a triopoly to a cartel.

In summary, when community interest clauses are implemented, an EU-like anti-dumping regulation induces anti-competitive changes in market structure, at least when products are not very differentiated and/or asymmetries are relatively modest. In these cases moves from a triopoly to a full cartel (area C) or from a domestic cartel towards a full cartel (area B) will be observed.

3.3. Cost asymmetries: the community interest clause unimplemented ($G = \{2(\pi_i - \varepsilon)\} + t.q_F$)

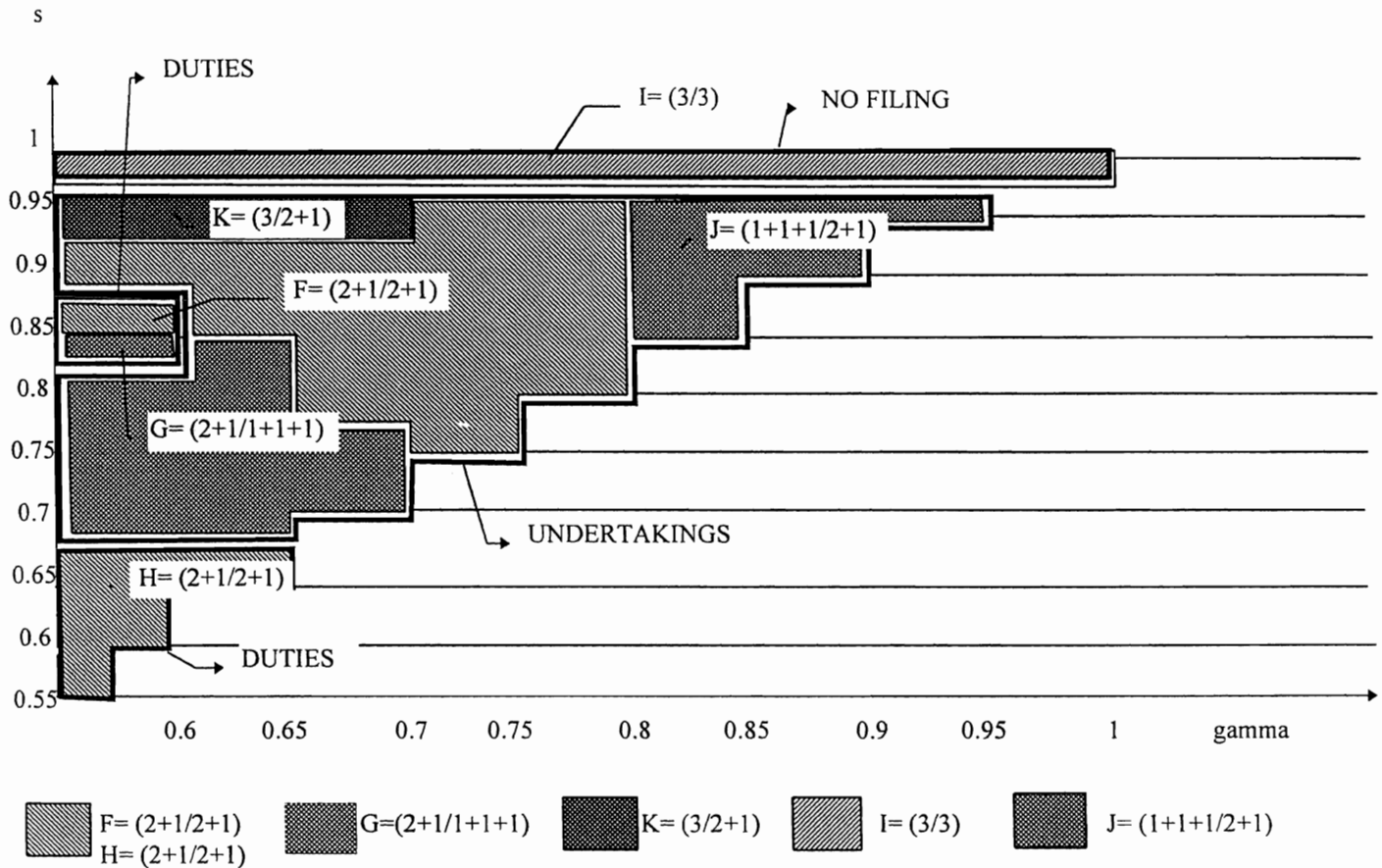


Figure 2: Change in Market Structure and Antidumping Measures

Consumer surplus excluded in Government's objective $z_c=0$ and $z_t=1$

(i) A full cartel as pre- or no anti-dumping outcome

When consumer interests were taken into account, the presence of an EU-like anti-dumping legislation did not cause a change in market structure, when government imposed an undertaking in a full cartel, or a duty was be imposed in a domestic cartel. When ignoring consumer interests, the opposite holds: government would decide on duties in the full cartel but will prefer an undertaking in a domestic cartel. Given that the domestic firms can perfectly foresee these government choices, they will prefer to collude only internally, in which case an undertaking will arise, rather than join a full cartel with

duties. Hence, we have a situation where the anti-dumping legislation reduces the scope for collusion, from a full international cartel to a domestic cartel only¹⁶.

(ii) A domestic cartel as pre- or no- anti-dumping outcome

When a **domestic cartel** would prevail without anti-dumping, which is the case when asymmetries are large or products are sufficiently differentiated (areas H, G and F), different outcomes prevail depending on government's decisions.

If the cost-asymmetry is large, i.e. $s < 0.7$, a duty is imposed independent of the market structure and the domestic cartel is maintained (area H). Hence, anti-dumping causes no effect on market structure and welfare improves from the duty. However if the asymmetry is not too large: $0.7 < s$, $\gamma < 0.8$, the government will impose an undertaking in a domestic cartel (2,1)-scenario. In a triopolistic market structure the government would be even more inclined towards undertakings: i.e. already with $0.7 \leq s < 0.8$. Given these government decisions, firms will always file if conditions are met, but will the market structure be affected by the existence of an EU-like anti-dumping legislation? When the government would decide on an undertaking in the (2,1)-scenario¹⁷, the domestic cartel is maintained and anti-dumping again does not affect the market structure, see area F. Note that if the asymmetry is very small, $s=0.95$, the foreign firm will also gain from an undertaking.

However there exist parameter configurations in which imposition of an EU-like anti-dumping legislation could destroy a domestic cartel, turning a (2,1) -scenario into a triopoly outcome, namely those configurations where the government would only decide on an undertaking in case of triopoly while favoring a duty in case of cartelisation, which arises with larger asymmetries and high enough product differentiation (area G). In such a situation the domestic firm will abstain from colluding and enjoying "only" duties. Instead, they will prefer a non-cooperative setting, in which case a more favorable undertaking, decided by the government, will more than compensate for the foregone collusive profits. This is at least if filing is possible in a triopoly (i.e. $s < 0.85$). Hence the presence of an anti-dumping regulation would break a domestic cartel and establish a triopoly, be it with an undertaking, increasing total welfare¹⁸. We have again a case where anti-dumping legislation serves as an instrument of anti-trust policy!¹⁹

¹⁶ If the government would commit to a duty upfront, the full cartel can be maintained. A commitment to an undertaking decision, would install a (2,1) scenario. Because of the tariff revenues the government would prefer to commit to a duty rather than an undertaking, when it ignores consumer interests.

¹⁷ Note that in a triopoly a similar undertaking decision would prevail, while in a full cartel, the government decides typically on a duty. But even if an undertaking would also be decided on in a full cartel, which occurs with the level of differentiation and the asymmetry not too high, the domestic firm would still prefer a partial collusion with only domestic firms.

¹⁸ Domestic firms gain despite the abundance of collusion, but through the imposition of an undertaking. The consumers loose from the undertaking, but the loss is tempered through the move to non-cooperative domestic firm behavior.

¹⁹ If the government would precommit to an undertaking, there would be no change in market structure: a (2,1) scenario is maintained. If the government would precommit to a duty, the market structure that would arise is a full cartel, preferred by the domestic as well as the foreign producers.

(iii) *A triopoly as pre- or no- anti-dumping outcome*

A triopoly as pre-anti-dumping scenario arises if products are not too differentiated (area J). In the presence of an anti-dumping regulation, where there is no filing possibility in triopoly, the domestic firms will be willing to collude domestically, only because of the protection offered by the antidumping regulation. Indeed, when consumer interests are ignored, the government would always decide on an undertaking in case of filing, independent of the market structure prevailing. Through the undertaking, the domestic firms will be colluding. The scope of this collusion is restricted to the domestic firms only. A full cartel is not attractive for the domestic firms, with an advantaged foreign player, given the too homogeneous products. Hence, the EU-like anti-dumping legislation would result in a domestic cartel that would else have broken down because of the foreign entry, again a case of collision between anti-dumping and anti-trust. Contrary to the case where consumer interests would be taken into account, there is never a move to a full cartel, since the government is willing to impose an undertaking already in a domestic cartel when it only considers local producer interests, while only a duty would be imposed when consumer interests are taken into account.

3.4. Cost asymmetries: Domestic Producers Interest only ($G = \{2(\pi_i - \varepsilon)\}$)

Given that tariff revenues may not always be permanently acquired, i.e. when they have to be returned, cf. supra, or because they are considered to be windfall benefits to the government, it is worthwhile to consider the sensitivity of the results to the inclusion or not of tariff revenues in the government's objective function.

When tariff revenues are ignored, i.e. only domestic firm profits are taken into account, domestic firms will always file if conditions are met, given that the government will always impose an undertaking throughout. All this implies that the pro-competitive effect of anti-dumping regulation derived supra (area G in figure 2), vanishes when tariff revenues are ignored. Indeed the pro-competitive effect arose because the government decided on an undertaking in triopoly but, induced by the revenue generation, would impose a duty in a duopoly, pushing the domestic firm away from a domestic collusion towards non-cooperative behavior. In this area of parameter configurations, in the absence of tariff revenues, the domestic cartel that would prevail without anti-dumping regulation is maintained in case of anti-dumping regulation, be it with undertaking. The pro-competitive effect of anti-dumping regulation in case of high differentiation and low asymmetry, where a full cartel with duties would be abandoned for a domestic cartel with undertaking (area K in figure 2), is maintained even if undertakings would also prevail in a full cartel (area N in figure 3). This indicates that this pro-competitive effect prevails as soon as there is protection, not necessarily because of higher protection in less cooperative settings.

Hence, from an anti-trust point of view, government's commitment to a anti-dumping intervention is undesirable, at least in this parameter constellation.

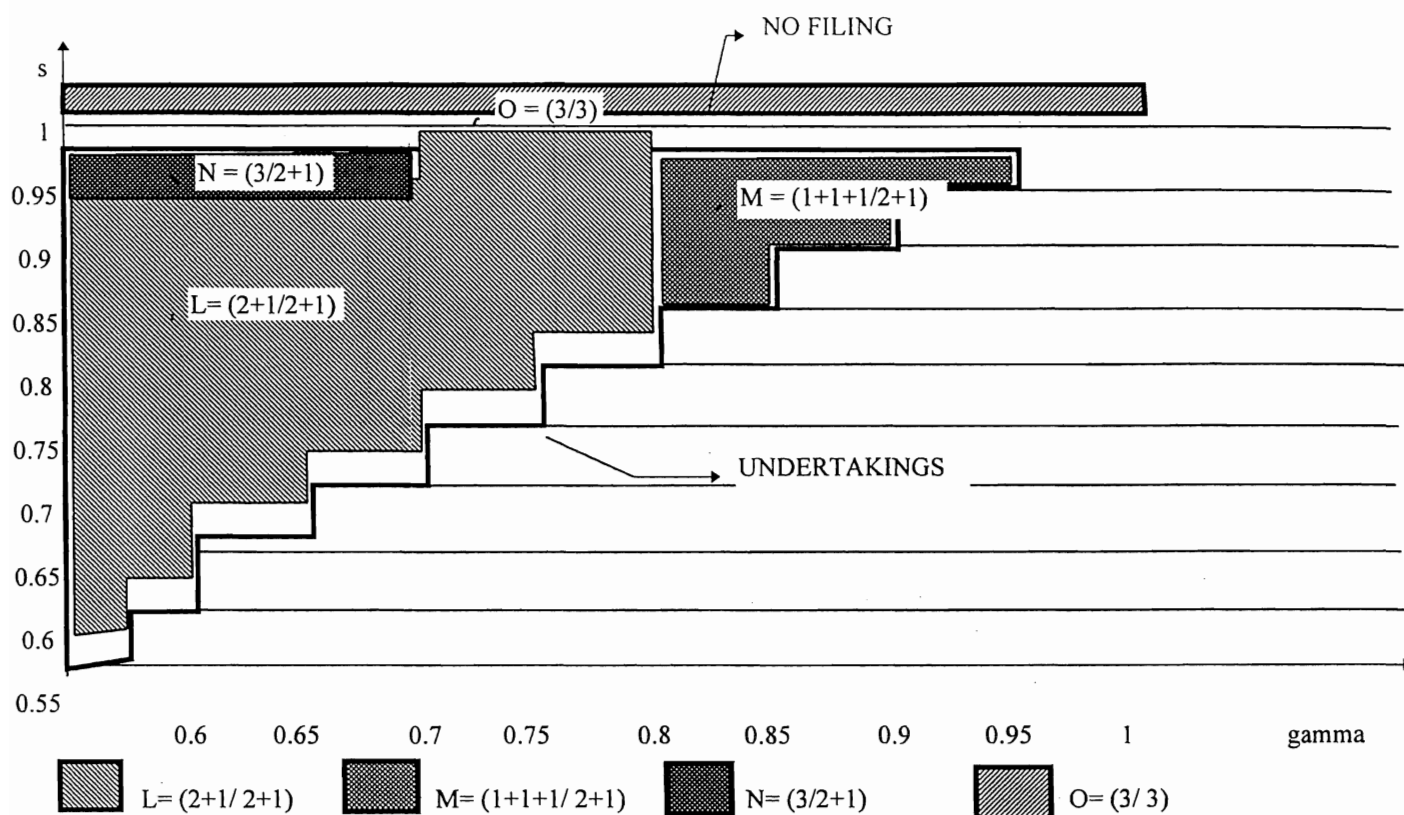


Figure 3: Change in market Structure and Antidumping Measures

Tariff revenues excluded and Consumer surplus excluded $z_c=0$ and $z_t=0$

Note that the results described here, i.e. anti-competitive effects of antidumping in case of low differentiation and pro-competitive effects in case of low asymmetry and high differentiation, depend on the peculiarity that the government will always impose an undertaking, in the absence of tariff revenues. Consequently, the results reported in figure 3 can also be interpreted as the outcome in case of government's commitment to an undertaking decision. Also the case where duty levels would be imposed that result in post-file rather than pre-file equal prices, in which case duties or undertakings have an identical impact on firm profits, gives the same results in terms of market structure changes.

4. Robustness of the Results

4.1. Side payments and cooperative solutions

As indicated supra, if side payments between producers were allowed and are legally enforceable, the market outcome that would prevail with and without anti-dumping, is the outcome that yields the highest total industry profits, which is a full cartel setting. Irrespective of asymmetries and product differentiation, the foreign firm always realizes enough extra benefits from a full cartel to compensate the domestic firms. Hence, whatever the outcome of the anti-dumping procedure, the final market

outcome will always be a full cartel, without the domestic firms filing. While anti-dumping does not affect the market outcome in this case, it will affect the size of the money transfer required from the foreign firm to compensate the domestic firms. The domestic firms gain from anti-dumping measures and hence will have to be compensated more to move to a full cartel. With a number of noticeable exemptions, cf. supra, the foreign firm typically loses and hence is willing to pay more to move to its preferred outcome.

Similarly, if firms are allowed to explicitly cooperate, anything that Pareto dominates the alternative scenario can be established²⁰. With joint (domestic and foreign) profits always highest in a full cartel, the latter will be the final market outcome in all cases. While the presence of antidumping does not affect the market outcome in this case, it does affect what parties can secure in the bargaining process, by affecting the threat point positions.

4.2. Pre-file settlements.

In most of the observed outcomes, domestic firms will file and governments will impose an anti-dumping measure, be it a duty or an undertaking. With the model assumption of complete information, the foreign firm can and will correctly anticipate the government's decision. Why then would the foreign firm not immediately select the price/quantity combination that would prevail after the government intervention, hence avoiding filing costs? Note that in such a case, we would never observe any anti-dumping intervention, which contradicts empirical observations.

Typically, this problem is tackled in the literature by assuming uncertainty about the government decision (e.g. Reitzes (1993)), for instance because of uncertainty about the importance of the various components in the welfare function. As the previous section and comparing figure 1 and figure 2 abundantly details, government decisions can indeed depend critically on z_c . With high levels of differentiation, duties will always prevail, the lower left areas in both figure 1 and 2, whereas with high levels of γ , i.e. highly homogeneous goods, and low levels of asymmetry, the upper right area in both figures, undertakings will always arise. But in-between levels of differentiation will result in undertakings with consumer interests ignored, while duties are more likely to prevail if consumer interests are taken into account.

A second set of circumstances under which foreign firms might abstain from immediately selecting the post-anti-dumping outcome is the structure of the filing costs. No or negligible filing costs for the foreign firm or uncertainty about the filing costs of the domestic firms that could be expected to be substantial, again result in the foreign firm not choosing the post-intervention quantity/price upfront, at least if it would be harmed by the intervention.

A third reason why foreign firms would not immediately quote the ex post price/quantity and avoid filing, is because it typically takes time before the filing procedure is finished and the duty or

²⁰. A cooperative Nash bargaining solution for instance, would give each party at least his best alternative plus a fraction of the extra benefits from cooperation, where this fraction depends on the parties' bargaining power.

undertaking is imposed. An analysis of EU cases learns that the investigation period on average lasts 12 months (Messerlin (1989)). During that period usually no measures are imposed ²¹. Suppose it takes 1 period before the investigation procedure is finished. The model would have to be adjusted such that the payoffs cover 2 periods: $\pi^{\text{nomeas}} + \delta (\pi^{\text{aftermeas}} - \epsilon)$ for every player. In such a 2-period model, the decision of the government as well as the domestic firm to file or not remains as analyzed supra. The foreign firm however needs to evaluate whether to “do nothing”, which yields $\pi^{\text{F nomeas}} - \epsilon + \delta \pi^{\text{F aftermeas}}$ versus already quoting in the first period the price/quantity that corresponds to the outcome after, if any, filing, which yields $(1+\delta)\pi^{\text{F aftermeas}}$

As long as $\pi^{\text{F nomeas}} - \epsilon > \pi^{\text{F aftermeas}}$ foreign firms have no interest in anticipating the government action. This condition can easily be checked and will typically hold when anti-dumping hurts the foreign firm. However situations can be pinpointed where the foreign firm, within a given market structure, benefits from the anti-dumping regulation typically in a domestic cartel when an undertaking would be decided and when the asymmetries are very small (i.c. $s=0.95$). In this case, irrespective of γ and irrespective of the filing costs, no filing procedure would be observed in a domestic cartel. All this implies that in the upper area of area F in figure 2, with a domestic cartel prevailing without and with anti-dumping intervention, the results remain as in the one-period model, namely a domestic cartel, where this domestic cartel will operate with an equal price constraint. But, contrary to the one-period model, both the domestic and the foreign firm will avoid the filing costs.

4.3. Filing costs

Filing costs represent all expenditures associated with filing, such as legal expenses, administration costs, but also the opportunity costs of managerial or other personnel time spent on the case. As already indicated, the level of filing costs considered in the previous section is relatively modest: only 1% of pre-entry profits. Lower levels of ϵ do not change the reported results ²². Ofcourse, if filing costs would be prohibitively high to outweigh the domestic firm's benefits from filing, the no-file option will prevail. This critical level of the filing cost depends on the extra benefits of the domestic firm from the filing option and hence will be specific for a duty or an undertaking decision and vary across market structures. The smaller the cost-asymmetry, the lower the critical filing costs will be. This implies that, all else equal, the larger the asymmetries, the more costs firms are willing to incur to get “protection”. Typically, the domestic firm realizes higher profits from an undertaking as compared to a duty, and hence is willing to incur higher filing costs when an undertaking can be foreseen. The market structure in which the firms are embedded likewise influences the critical filing costs. Typically, the critical filing costs will be highest in a full cartel, in-between in a domestic cartel and lowest in a triopoly. Therefore domestic firms are willing to pay most for anti-dumping measures when

²¹ Temporary measures can be imposed if asked for by the complaining European firms.

²² The level of $\epsilon=0.1$ is so low that it seldomly prohibits the domestic firms from filing. And even if it prohibits filing, the outcome that would arise if filing would be possible with lower ϵ would never interfere with the final outcome, as reported supra.

they are in a full cartel scenario. This result holds independent of the level of differentiation and asymmetry. However, the difference between these critical costs reduces when firms become less asymmetric.²³

Given that the critical filing costs are specific for each market outcome, one could envisage settings in which filing costs are substantial enough to prevent firms from filing in some outcomes, while still allowing for a filing decision in others. This in turn is likely to have an impact on the final equilibrium outcome. Of course, if filing costs are too high to prevent filing in any market structure, the antidumping procedure is never activated and hence does not affect the market structure. Most of the supra observed anti-competitive effects of antidumping remain or are reinforced with filing costs higher than 0.1.²⁴ However, the pro-competitive effects of antidumping are not robust for higher levels of filing costs. For instance, if filing costs are high enough to prevent filing in area G in figure 2, but not high enough to prevent filing in case of a full cartel with duties,²⁵ the final equilibrium outcome would be a domestic cartel with no file. Although the domestic firm would prefer a full cartel with a duty imposed, the foreign firm will not align on the cartel. Hence, in this case the anti-dumping regulation has no impact from an anti-trust point of view. Similarly, in area K in figure 2, the beneficial move from a full cartel towards a domestic cartel because of the anti-dumping procedure, would vanish with higher filing costs. If filing costs are higher than the critical filing costs in a domestic cartel, it would prevent filing in a (2,1)-scenario with undertaking, resulting in a full cartel as the final equilibrium, unaffected by the existence of an anti-dumping regulation.

5. Welfare effects and rent shifting

The model can also be used to tackle the question of whether anti-dumping protection increases European welfare vis-à-vis welfare in the absence of protection: a critical question from a trade policy point of view. The ability of governments to increase welfare through unilateral protection in imperfectly competitive industries was first developed by Brander & Spencer (1985) and Eaton and Grossman (1986). In the literature, this is known as the strategic trade policy argument for protection. When governments can credibly precommit to a specific trade policy, government intervention secures a larger market share for the domestic producers and shifts rent from the foreign producers to the domestic economy. In this paper, the government does not precommit to the use of anti-dumping

²³ As a consequence of this, for s high enough, $s=0.9, 0.95$, the critical filing costs are higher in a domestic cartel as compared to a full cartel, at least for high levels of differentiation ($\gamma \leq 0.7$).

²⁴ For example, the anti-competitive effect observed in area J in figure 2 is reinforced if filing costs could be high enough to prevent filing in a triopoly and a domestic cartel, while still low enough to allow for filing in a full cartel (e.g. for $\gamma=0.95$; ϵ could be larger than .095 but still smaller than .498, where this range shrinks with lower values of γ). In this case the final market outcome with an anti-dumping procedure, would be a full cartel with undertaking, indicating that higher filing costs would cause higher detrimental effect of the anti-dumping procedure on the market structure.

²⁵ e.g. with $\gamma=0.7$ this would amount to ϵ being larger than .202 but still smaller than .289. Note that this range in which the filing costs should be situated reduces with lower values of γ , to vanish completely with $\gamma=0.55$

measures but there is perfect foresight as to what the government's objectives are and which measures will be taken in the event of filing an anti-dumping complaint. Hence the behavior of foreign and domestic producers will be affected by the presence of such a regulation. The government's objective from its narrowest to its broadest interpretation can respectively vary from local producer surplus only, to the sum of local producer surplus as well as consumer surplus²⁶ and including any possible tariff revenues. From a normative perspective, it can be argued that the latter objective is what the EU government should maximize. In what follows the results under the various different government objectives are contrasted with what *ought* to be government's concern. Before moving to the results, it is important to note that welfare effects arise not only because of the imposition of a duty or an undertaking within a given market structure, but also because of possible changes in firm's incentives to collude induced by the existence of an anti-dumping regulation. Furthermore, the imposition of anti-dumping measures does not always coincide with rent-shifting. Cases will be pinpointed where an increase in domestic surplus because of the anti-dumping regulation is not always to the detriment of foreign firms.

5.1. Community Interest Clause Implemented ($G = CS + 2(\pi_i - \epsilon) + tq_F$)

When the product asymmetry and the cost advantage for the foreign firm are substantial, $\gamma < s < 0.8$, it is optimal for the government to install an anti-dumping duty. Figure 4 clearly shows that whenever a duty is imposed, total community welfare increases. In these cases, the duty revenue and increases in local producer surplus are high enough to offset the reduction in consumer surplus as a result of anti-dumping protection. Under duty protection, local producer surplus increases and foreign surplus decreases. Interesting to note is that the scope for rent-shifting increases with the cost advantage of the foreign firm.

An increase in welfare with an undertaking is far less likely. The only parameter constellations where this occurs is for low cost asymmetries by high product differentiation resulting in a full cartel market structure. For this vertically hatched area (see figure 4) the loss in consumer surplus is more than compensated by the shift in profits from the foreign to the domestic firms due to the undertaking.

²⁶ Whereas in Brander & Spencer (1985) and Eaton & Grossman (1986), a domestic and a foreign firm compete in a third market, the model here has firms competing in the local market, explicitly taking into account local consumer surplus.

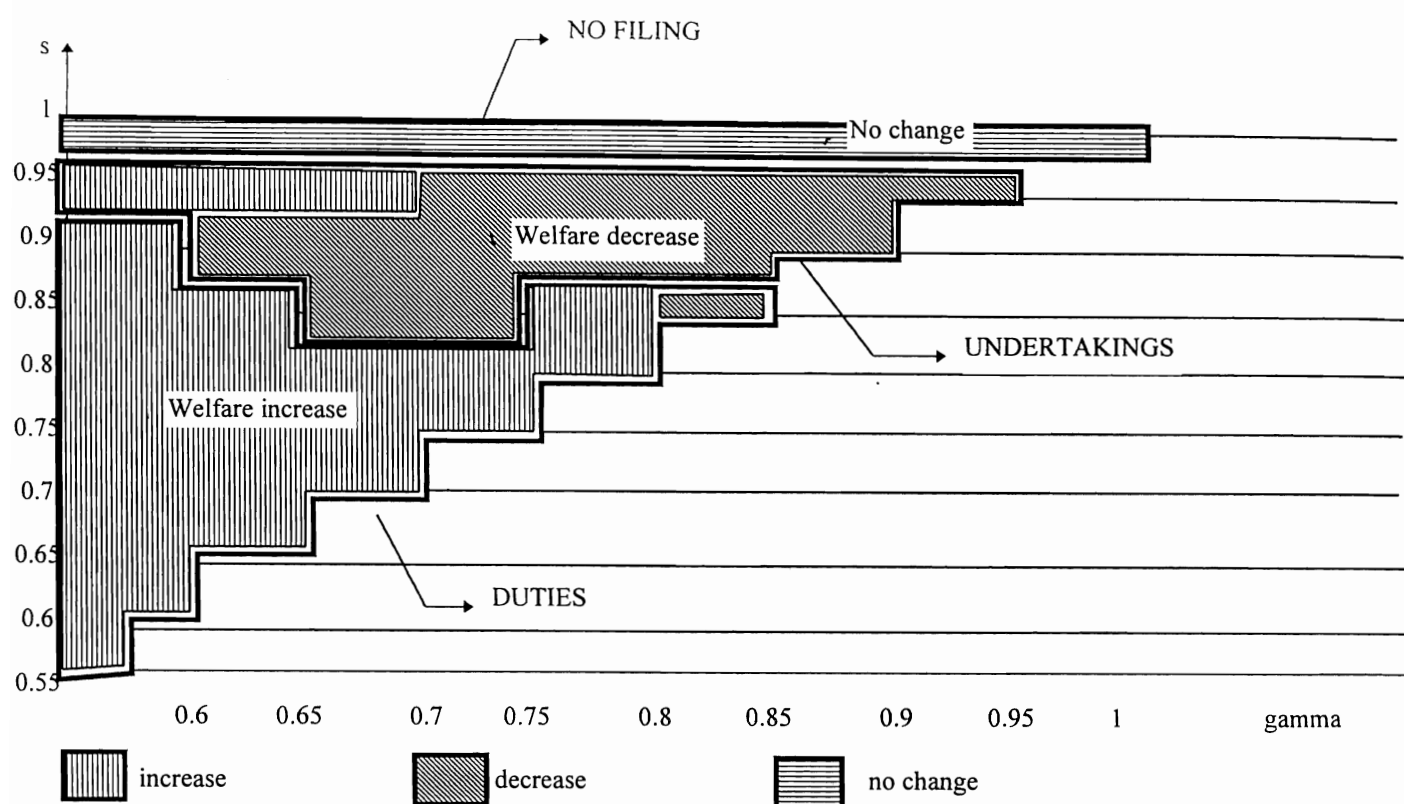


Figure 4: The change in welfare between the equilibrium market structure with anti-dumping regulation and the market structure in case of no-Anti-dumping regulation
Consumer surplus and tariff revenues included in the government's objective ($z_c=1$ and $z_f=1$)

For all other parameter constellations where undertakings are imposed, domestic welfare is reduced. Moreover, the market is cartelized as a result of the undertakings. In this area the gains that accrue to local producers are far smaller than the losses suffered by the local consumers. The overall reduction in welfare can be split up in two opposing forces. This can best be understood by comparing figure 4 with figure 1. On the one hand there is a negative welfare effect caused by the anti-competitive effect of an undertaking on the market structure. On the other hand, the imposition of an undertaking yields a positive welfare effect. However, the cartelization of the market is the more dominant effect of the two, resulting in a net negative welfare impact. When product differentiation is reduced, i.e. higher levels of γ , the negative welfare change caused by the change in market structure is even reinforced as we go from a triopoly to a full international cartel. In these cases, an undertaking also increases the profits of the foreign firm.

5.2. Community Interest Clause Unimplemented ($G = (2(\pi_i - \varepsilon) + tq_F)$)

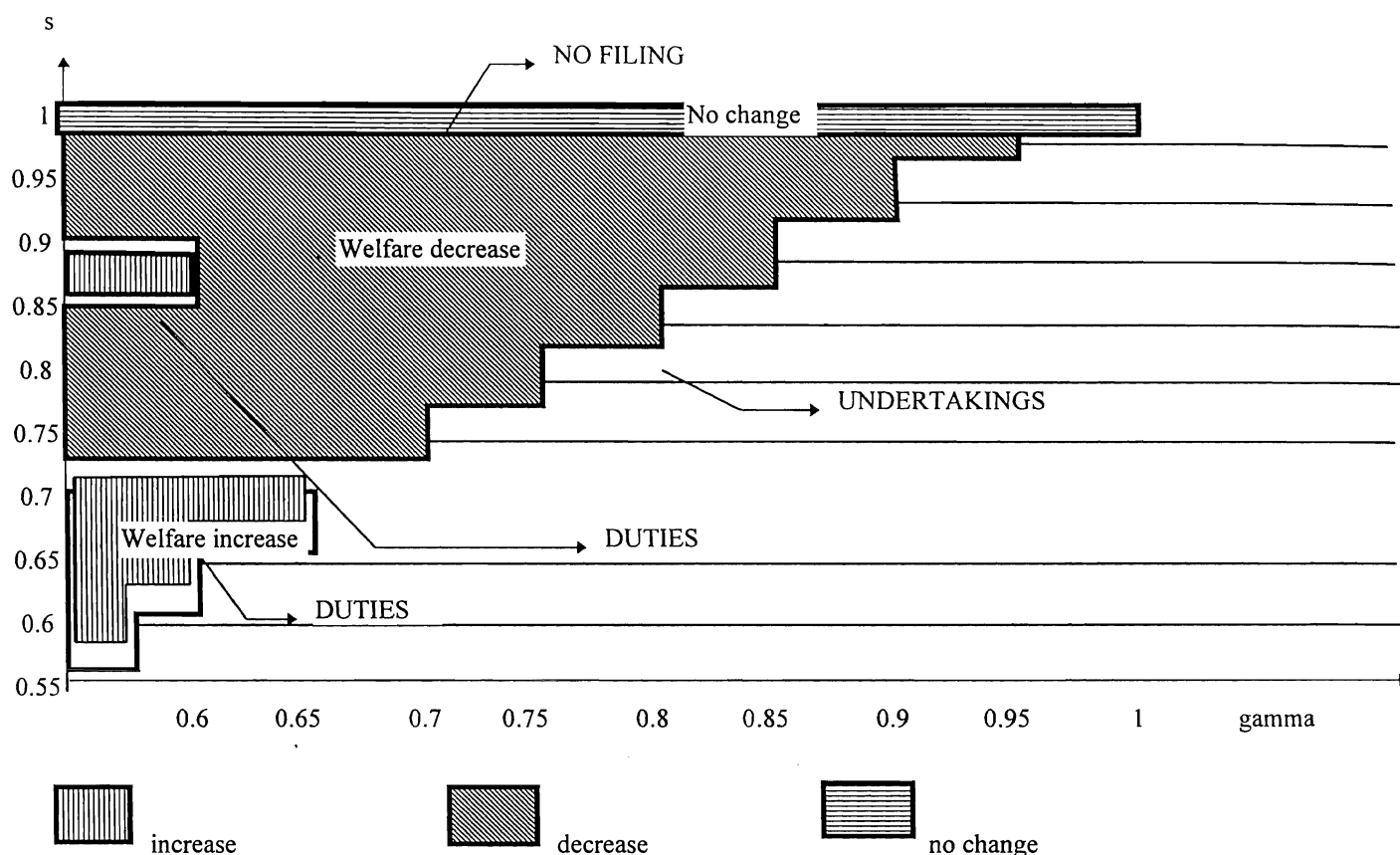


Figure 5: The change in welfare between the equilibrium market structure with anti-dumping regulation and the market structure in case of no-Anti-dumping regulation

Consumer surplus excluded and tariff revenues included in the government's objective ($z_c=0$ and $z_r=1$)

Again a correspondence between the welfare changes and the type of measures installed can be established from comparing fig 5 and fig 2. With a duty, total welfare increases, whereas an undertaking always results in a welfare decrease, irrespective whether the undertaking has a pro-competitive ($\gamma < 0.75$) or an anti-competitive effect ($\gamma > 0.8$). In those instances where an undertaking enhances competition, the welfare gain from increased competition is offset by the undertaking. When an undertaking reduces competition, this leads to a negative welfare change that reinforces the negative welfare effect of protection. Hence, pro-competitive effects of antidumping are only welfare improving if they involve duties rather than undertakings.

When only local producer surplus is taken into account and tariff revenues are ignored, the results are very homogeneous for all parameter constellations and hence not shown here. Although domestic producers are always better off with than without the undertaking, total welfare is always lower under anti-dumping protection. This result holds both in the case where anti-dumping measures have a pro- as opposed to an anti-competitive effect.

6. Contingent protection and rent-seeking

Previously we touched upon the reason why a government may want to limit its objective to producer surplus only. According to the political economy of protection literature, the political market is similar to other markets to the extent that politicians maximize their own utility rather than general welfare. The level of protection is then the outcome of supply and demand forces. Typically, the demand side consisting of domestic producers is well organized and is willing to devote resources trying to get a decision in its favor. This is called rent-seeking. Finger, Hall and Nelson (1982) and Tharakan and Waelbroeck (1994) are two econometric studies that confirm the political economy explanation for antidumping protection in the US and the EU respectively.

The simulation results in our paper suggest that domestic firms' profits are always highest with an undertaking in the (2,1)-market structure. However, when the government cares about total community welfare, this solution is never arrived at. When products are very heterogeneous and cost asymmetries large (bottom left area in figure 1), it imposes duties which lead only to a limited gain for domestic producers. When products are more homogeneous and cost differences small (top right corner in figure 1), the equilibrium outcome is a full cartel where undertakings will prevail, since in a domestic cartel only a duty will prevail. Although domestic producers' gains under undertakings in a full cartel are already higher than under a duty, they could have gotten more if only the government had decided on an undertaking in the (2,1)-structure. Only if the government limits its objective to domestic producer surplus, this outcome is reached and domestic producers get their highest payoff possible in the game and this for all the parameter constellations.

Thus, domestic producers have an incentive to engage in rent-seeking activities in order to try and induce the government to change its objective from general welfare to domestic profits only. A measure for the rent-seeking incentive could be a comparison between domestic profits when the government maximizes general welfare and their profits when the government maximizes producer surplus only. From this we conclude that the incentive to rent-seeking increases when the cost asymmetry is higher and products differ more.

The possibility to rent-seeking is not limited to the domestic firms only but also applies to the foreign firm. The foreign firm is always best off without intervention and the highest payoff is reached under the full cartel (3)-situation without antidumping measures.²⁷ In case the government is determined to intervene, foreign firms can still try to reach their most preferred anti-dumping measure. Under the (2,1)-market structure, for small cost differences, the foreign firm shares the domestic firm's preference for undertakings over duties. However, for substantial cost differences the foreign firm is better off with a duty (see also footnote 10). In those cases, domestic and foreign firms' interests clash.

²⁷ The no intervention outcomes can be arrived at if the government were to extend its objective to the sum of domestic and foreign profits rather than to domestic profits only. In a more general equilibrium analysis, this extension would be more likely anyway in case the foreign firm has substantial retaliatory power.

In a full cartel (3)-structure and in a triopoly (1,1,1,-)-structure, both the domestic and the foreign firm will always prefer an undertaking over a duty.²⁸

7. Conclusions

This paper is the first to study the effect of European anti-dumping policy on market structure and welfare. In the set up of the model we tried to capture the EU decision-making process involved as closely as possible. In earlier empirical studies it has been alleged that European antidumping cases often involve cartels, probably because they are in a better position to claim injury from dumped imports. In this paper we started off with the existence of a domestic European cartel in the absence of foreign entry. Then we proceeded to analyse the incentives provided by the antidumping legislation for domestic and foreign firms to engage or not in a domestic or full cartel after foreign entry.

The results showed that when domestic and foreign firms are perfectly symmetric, all firms have an incentive to collude, irrespective of whether an anti-dumping legislation is in existence or not. The analysis becomes more interesting when asymmetries between the domestic and the foreign firms are considered. When the EU acts in the spirit of the Community Interest Clause, the antidumping measures taken are predominantly duties. Only when cost differences are small, undertakings will be installed. When the Community Interest clause is implemented and when antidumping measures change market structure, which happens with not too large cost differences and when products are not too differentiated, the effect is always an anticompetitive one. In some instances the EU market structure goes from a domestic to an international cartel and in other instances from a triopoly to a full international cartel when antidumping law is implemented. In all those cases antidumping collides with antitrust policy.

When the scope of the government objective function is narrowed down to domestic producer surplus and tariff revenue only, the model predominantly predicts the use of undertakings. Only in the event of substantial cost differences and considerable product heterogeneity between domestic and foreign firms, duties will be imposed. Ignoring consumer welfare results in anti-dumping to either have a pro-competitive or an anti-competitive effect. In a more limited number of cases where we have a pro-competitive effect, namely when cost differences are not too large and products are sufficiently differentiated, the model shows that antidumping law can serve as an instrument for antitrust policy in the EU. Domestic firms are induced to less collusive market structures because of the (higher) protection offered by the antidumping law.

²⁸ These analytical results can be used to explain EU anti-dumping practice (Vandenbussche (1996)). Japanese firms are typically found to lobby to obtain an undertaking decision, a practice which confirms a model setting of not too large cost asymmetries. However the EU typically decides on duties rather than undertakings when Japanese firms are involved. When consumer interests are taken into account, the model indeed indicates this as the optimal policy choice when products are sufficiently differentiated (see the upper left part of area A in figure 1). And even if consumer interests would be ignored, the model predicts a duty decision if products are sufficiently differentiated (lower left part of area F in figure 2). For Eastern European companies, however, where product differentiation is typically less obvious, undertakings are observed more frequently.

If we narrow government objective function even further to domestic producer surplus only, undertakings are the only type of measures observed for all cases. The market structure is usually not affected by the antidumping implementation. However when cost disadvantages are only modest, the protection offered by the undertaking to the domestic producers will induce market structure changes. Pro-competitive effects can arise when products are sufficiently differentiated while anti-competitive effects emerge with more homogeneous goods.

A welfare analysis, taking into account not only the effects of anti-dumping measures but also the impact of anti-dumping regulation on firms incentives to collude or not, revealed that the imposition of a duty in the equilibrium market structure typically increases total domestic welfare. In case of a duty, the rent shifting from foreign producers more than compensates domestic consumer losses. The scope for such rent-shifting is normally larger with larger cost-asymmetries. However in case of undertakings, the welfare effects tend to be negative. A decrease in consumer surplus from the increase in price as well as the typical anti-competitive effect of anti-dumping outweigh the benefits to domestic producers. Even in cases where undertakings have a pro-competitive effect, the welfare gain from increased competition never compensates the losses from the protection offered through an undertaking.

With respect to the type of measure installed, our model clearly showed that decreasing the importance of consumer interests in the government welfare function led to an increasing number of undertakings. Given that empirical studies have pointed out the EU's tendency towards undertakings rather than duties, our model can be used to explain this tendency as the result of mainly safeguarding domestic producers' interests. This confirms practitioners' well established intuitive beliefs.

The findings reported in this paper suggest that use of antidumping measures can both have a pro- or an anti-competitive effect, depending on government welfare, cost asymmetries and product heterogeneity. By showing this we encompassed previous findings in the antidumping literature that showed that antidumping either had a pro- (Reitzes 1993; Fischer, 1992) or an anti-competitive effect (Staiger & Wolak 1992). From a trade policy perspective, the results clearly ask for a cautious policy stance given the difficulty of assessing circumstances where one or the other effect applies. In general, pro-competitive effects tend to occur with high product differentiation and limited cost asymmetries. But they are sensitive to filing costs and only occur when consumers interests are not taken into account. And even more importantly, given that in case undertakings induce a pro-competitive effect, total EU welfare is nevertheless reduced, other specific measure to promote an anti-trust objective are called for. The most important policy conclusion seems to support the idea put forward by Gual (1995), that multiplicity of objectives should be avoided and that each policy should serve its own objectives with its own measures.

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